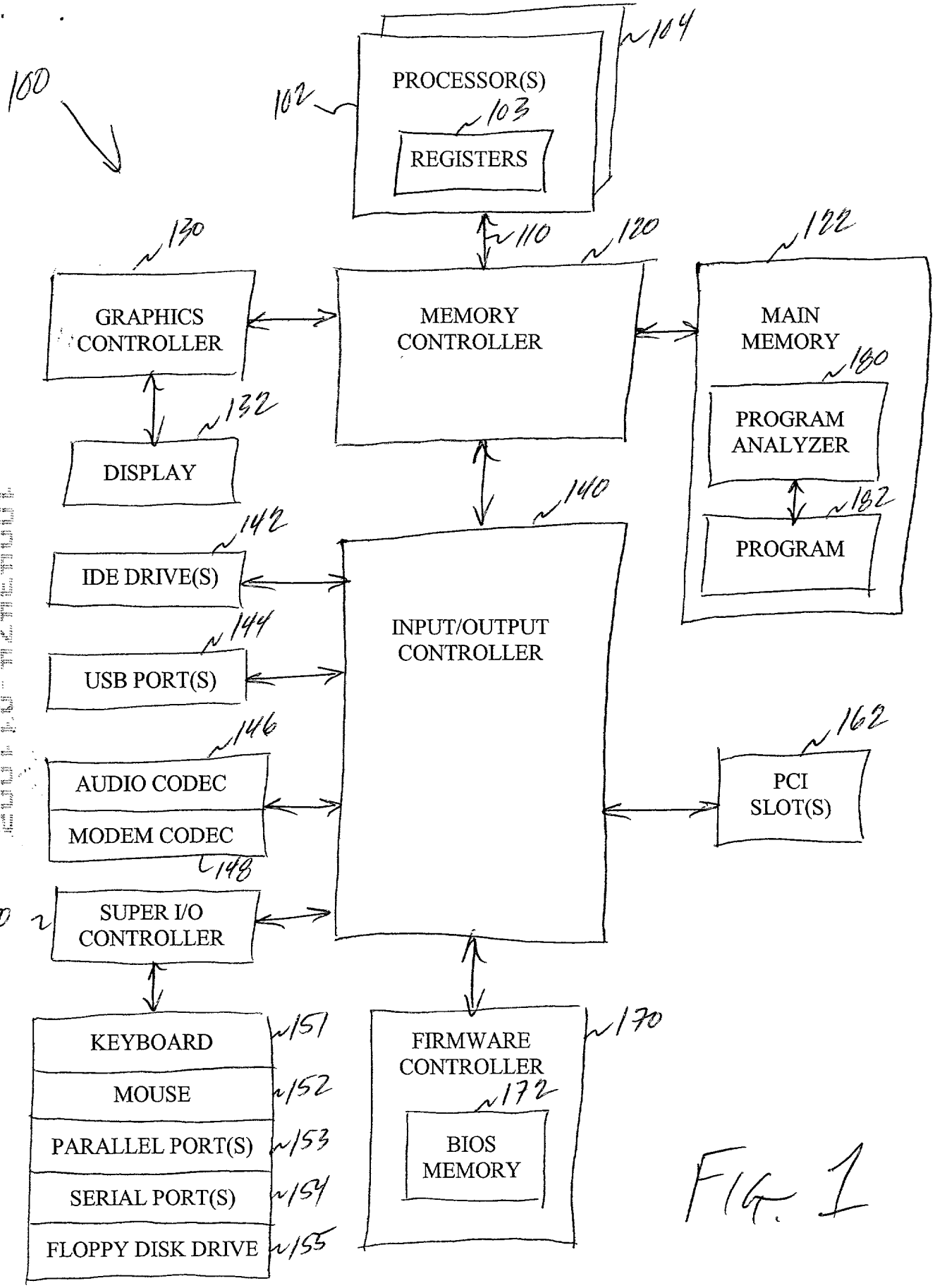
100
PROCESSOR(S)
104
102
103
REGISTERS
110
120
122
130
GRAPHICS CONTROLLER
MEMORY CONTROLLER
MAIN MEMORY
132
DISPLAY
180
PROGRAM ANALYZER
182
PROGRAM
140
142
IDE DRIVE(S)
144
USB PORT(S)
INPUT/OUTPUT CONTROLLER
146
AUDIO CODEC
MODEM CODEC
148
162
PCI SLOT(S)
150
SUPER I/O CONTROLLER
151
KEYBOARD
152
MOUSE
153
PARALLEL PORT(S)
154
SERIAL PORT(S)
155
FLOPPY DISK DRIVE
170
FIRMWARE CONTROLLER
172
BIOS MEMORY

FIG. 1

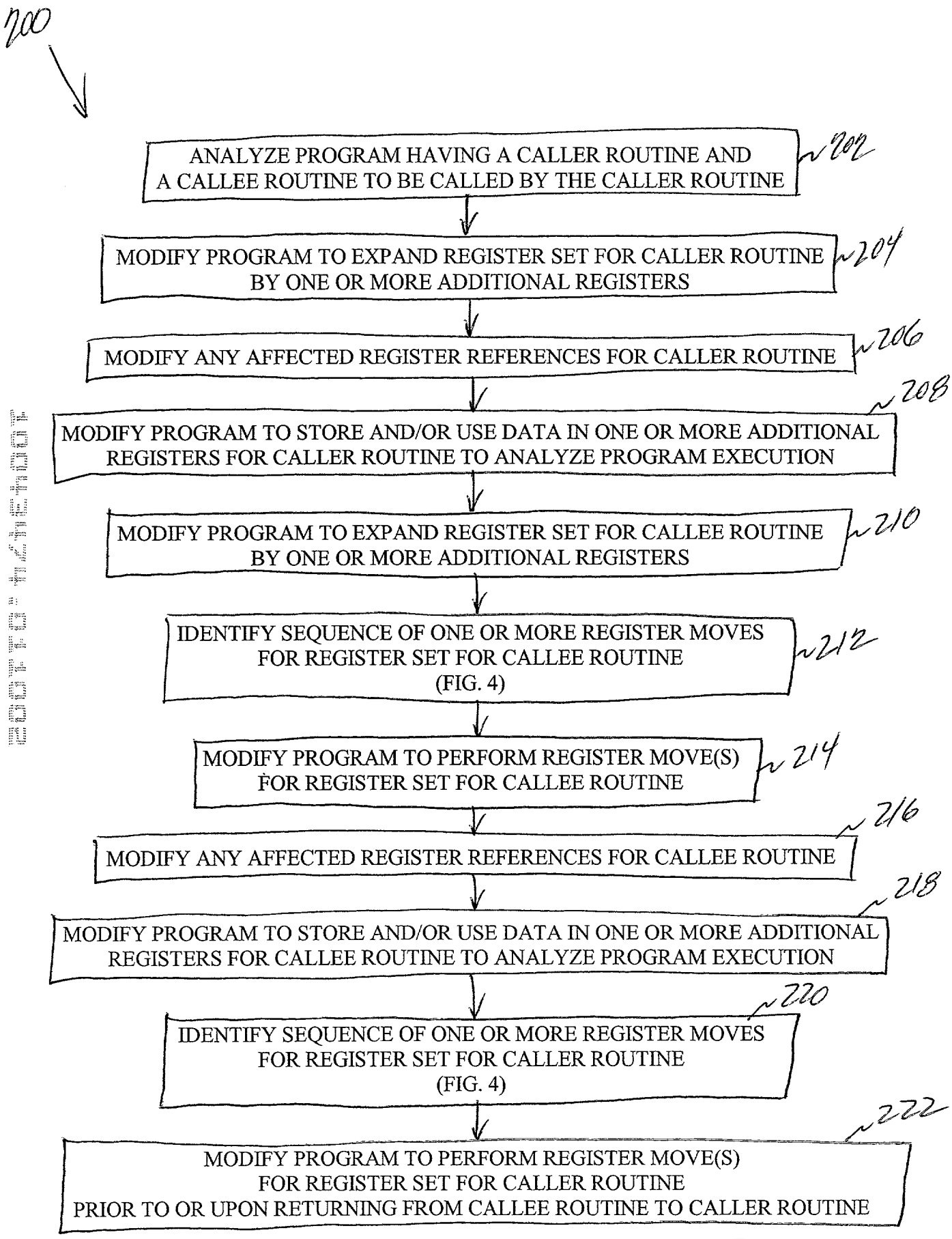
200
ANALYZE PROGRAM HAVING A CALLER ROUTINE AND A CALLEE ROUTINE TO BE CALLED BY THE CALLER ROUTINE
202
MODIFY PROGRAM TO EXPAND REGISTER SET FOR CALLER ROUTINE BY ONE OR MORE ADDITIONAL REGISTERS
204
MODIFY ANY AFFECTED REGISTER REFERENCES FOR CALLER ROUTINE
206
MODIFY PROGRAM TO STORE AND/OR USE DATA IN ONE OR MORE ADDITIONAL REGISTERS FOR CALLER ROUTINE TO ANALYZE PROGRAM EXECUTION
208
MODIFY PROGRAM TO EXPAND REGISTER SET FOR CALLEE ROUTINE BY ONE OR MORE ADDITIONAL REGISTERS
210
IDENTIFY SEQUENCE OF ONE OR MORE REGISTER MOVES FOR REGISTER SET FOR CALLEE ROUTINE (FIG. 4)
212
MODIFY PROGRAM TO PERFORM REGISTER MOVE(S) FOR REGISTER SET FOR CALLEE ROUTINE
214
MODIFY ANY AFFECTED REGISTER REFERENCES FOR CALLEE ROUTINE
216
MODIFY PROGRAM TO STORE AND/OR USE DATA IN ONE OR MORE ADDITIONAL REGISTERS FOR CALLEE ROUTINE TO ANALYZE PROGRAM EXECUTION
218
IDENTIFY SEQUENCE OF ONE OR MORE REGISTER MOVES FOR REGISTER SET FOR CALLER ROUTINE (FIG. 4)
220
MODIFY PROGRAM TO PERFORM REGISTER MOVE(S) FOR REGISTER SET FOR CALLER ROUTINE PRIOR TO OR UPON RETURNING FROM CALLEE ROUTINE TO CALLER ROUTINE
222

FIG. 2

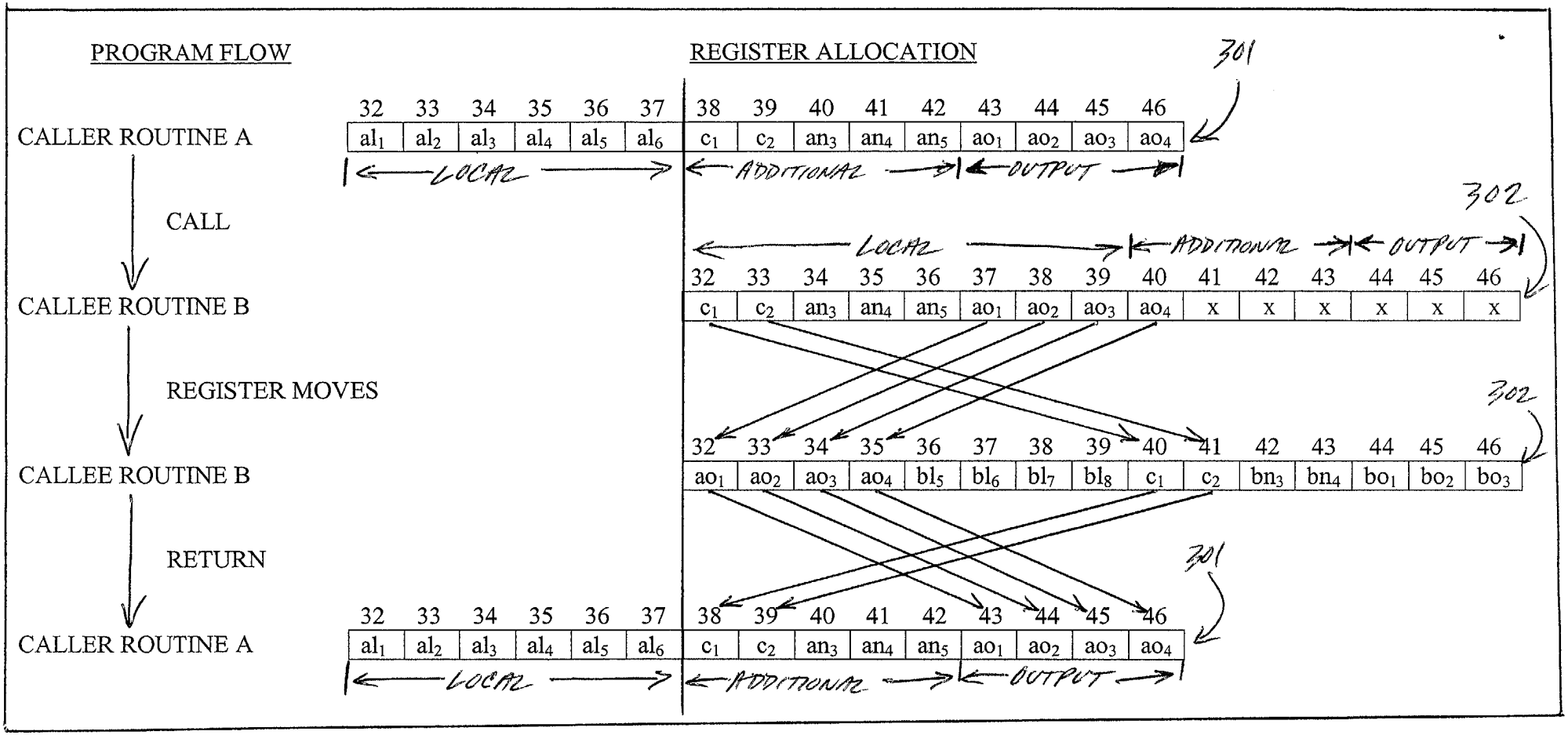
PROGRAM FLOW
REGISTER ALLOCATION
301
CALLER ROUTINE A
CALL
CALLEE ROUTINE B
REGISTER MOVES
CALLEE ROUTINE B
RETURN
CALLER ROUTINE A
LOCAL
ADDITIONAL
OUTPUT
302

FIG. 3

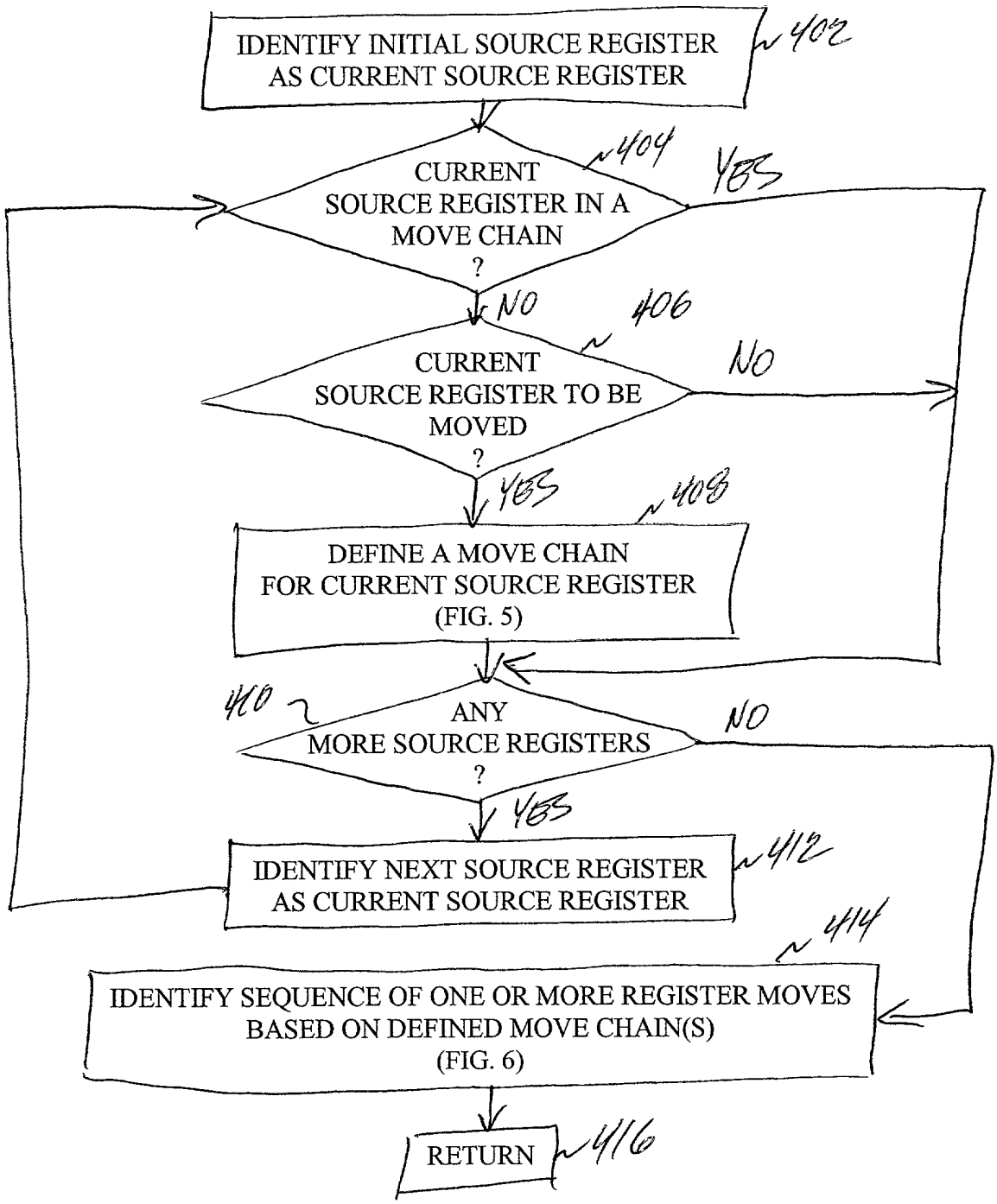
400
IDENTIFY INITIAL SOURCE REGISTER AS CURRENT SOURCE REGISTER
402
CURRENT SOURCE REGISTER IN A MOVE CHAIN ?
404
YES
NO
CURRENT SOURCE REGISTER TO BE MOVED ?
406
NO
YES
DEFINE A MOVE CHAIN FOR CURRENT SOURCE REGISTER (FIG. 5)
408
ANY MORE SOURCE REGISTERS ?
410
NO
YES
IDENTIFY NEXT SOURCE REGISTER AS CURRENT SOURCE REGISTER
412
IDENTIFY SEQUENCE OF ONE OR MORE REGISTER MOVES BASED ON DEFINED MOVE CHAIN(S) (FIG. 6)
414
RETURN
416

FIG. 4

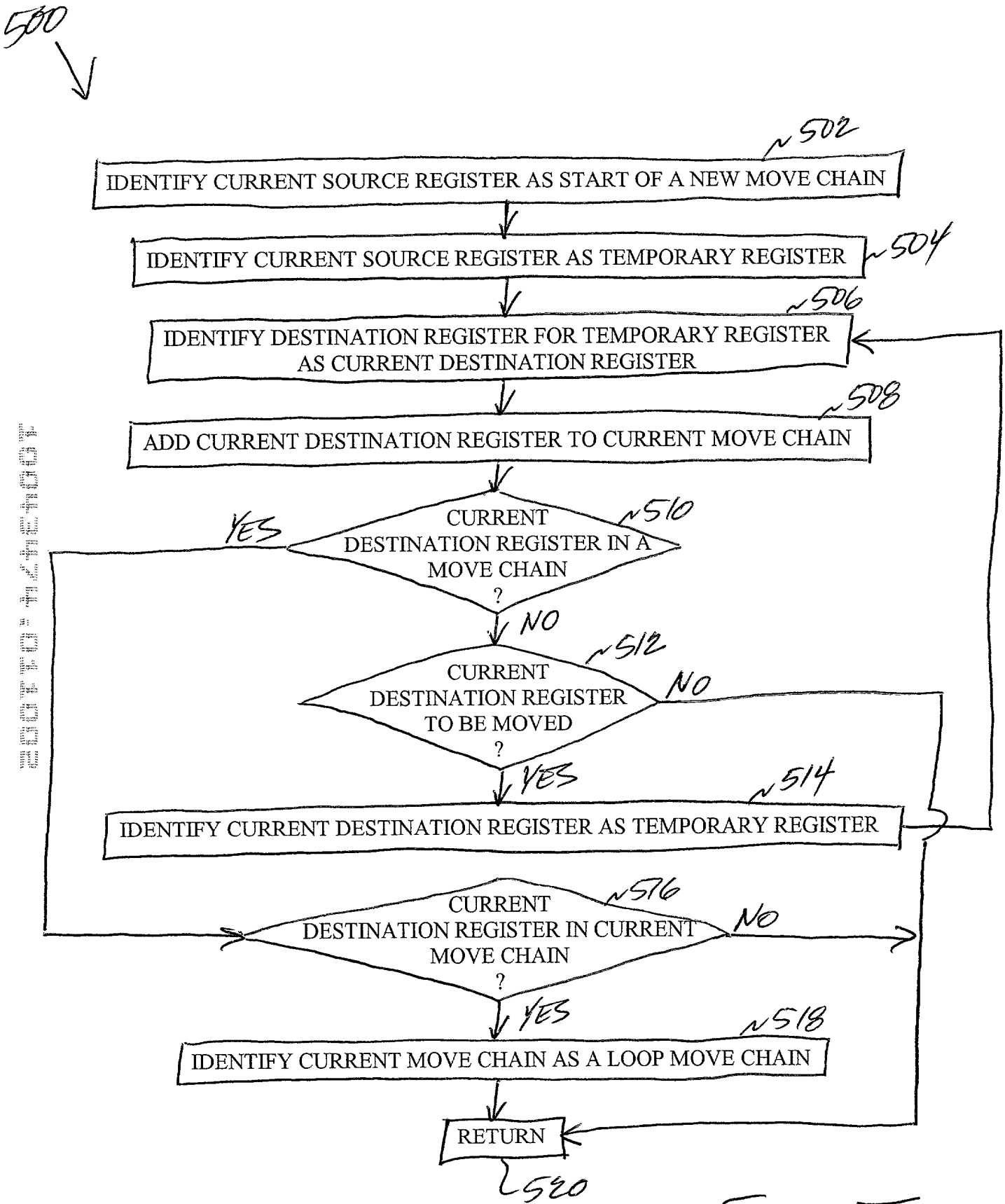
500
502
IDENTIFY CURRENT SOURCE REGISTER AS START OF A NEW MOVE CHAIN
504
IDENTIFY CURRENT SOURCE REGISTER AS TEMPORARY REGISTER
506
IDENTIFY DESTINATION REGISTER FOR TEMPORARY REGISTER AS CURRENT DESTINATION REGISTER
508
ADD CURRENT DESTINATION REGISTER TO CURRENT MOVE CHAIN
510
CURRENT DESTINATION REGISTER IN A MOVE CHAIN ?
YES
NO
512
CURRENT DESTINATION REGISTER TO BE MOVED ?
NO
YES
514
IDENTIFY CURRENT DESTINATION REGISTER AS TEMPORARY REGISTER
516
CURRENT DESTINATION REGISTER IN CURRENT MOVE CHAIN ?
NO
YES
518
IDENTIFY CURRENT MOVE CHAIN AS A LOOP MOVE CHAIN
RETURN
520

FIG. 5

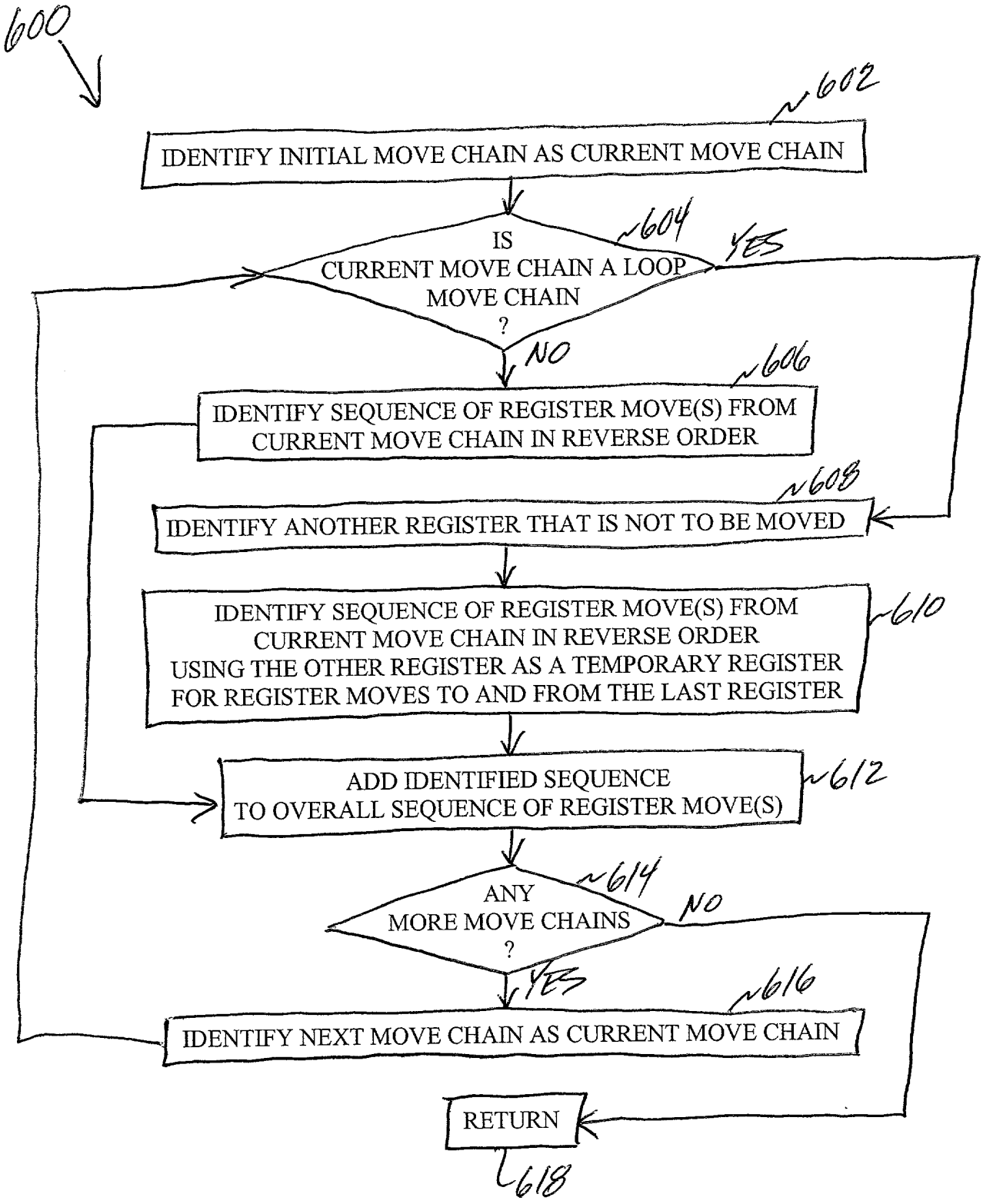
600
602
IDENTIFY INITIAL MOVE CHAIN AS CURRENT MOVE CHAIN
604
IS CURRENT MOVE CHAIN A LOOP MOVE CHAIN ?
YES
NO
606
IDENTIFY SEQUENCE OF REGISTER MOVE(S) FROM CURRENT MOVE CHAIN IN REVERSE ORDER
608
IDENTIFY ANOTHER REGISTER THAT IS NOT TO BE MOVED
610
IDENTIFY SEQUENCE OF REGISTER MOVE(S) FROM CURRENT MOVE CHAIN IN REVERSE ORDER USING THE OTHER REGISTER AS A TEMPORARY REGISTER FOR REGISTER MOVES TO AND FROM THE LAST REGISTER
612
ADD IDENTIFIED SEQUENCE TO OVERALL SEQUENCE OF REGISTER MOVE(S)
614
ANY MORE MOVE CHAINS ?
NO
YES
616
IDENTIFY NEXT MOVE CHAIN AS CURRENT MOVE CHAIN
RETURN
618

FIG. 6